CHAPTER 1

Introduction to Visual Basic 2005 Programming
1 Objectives

► Understand software and computer programs
► State the role of a developer in creating computer programs
► Specify the use of a graphical user interface and describe an event-driven program
► Specify the roles of input, processing, output, and data when running a program on a computer
► Describe the arithmetic operations a computer program can perform
Objectives

► Explain the logical operations a computer program can perform
► Define and describe the use of a database
► Identify the use of a computer programming language in general, and Visual Basic 2005 in particular
► Explain the use of Visual Studio 2005 when developing Visual Basic 2005 programs
► Specify the programming languages available for use with Visual Studio 2005
1 Objectives

► Explain the .NET 2.0 Framework
► Explain RAD
► Describe classes, objects, and the .NET Framework 2.0 class libraries
► Explain ADO.NET 2.0, ASP.NET 2.0, MSIL, and CLR
► Specify the types of Visual Basic 2005 applications
Introduction

The set of instructions that directs a computer to perform tasks is called computer software, or a computer program.
Introduction

Computer hardware is the physical equipment associated with a computer.
The basic function of many computer programs is to accept **data**, manipulate the data (**process**), and create **output data** or **information**.
In order for the computer to execute a program:

• Program and data must be placed in the computer’s random access memory (RAM)

• The central processing unit (CPU) can access the instructions in the program and the data in RAM to perform activities directed by the program
Saving, or storing, data refers to placing the data or software electronically on a storage medium

- Hard disk
- Universal Serial Bus (USB) drive

Persistent data remains available even after the computer power is turned off
A computer program is designed and developed by people known as computer programmers, or developers.

Developers are people skilled in designing computer programs and creating them using programming languages.

Applications may consist of several computer programs working together to solve a problem.

Computer programmers write the code for programs using a programming language.
Computer Programmers and Developers
Most Visual Basic 2005 programs are event-driven programs that communicate with the user through a graphical user interface (GUI).

- A GUI usually consists of a window, containing a variety of objects.

An event means the user has initiated an action that causes the program to perform the type of processing called for by the user’s action.
Event-Driven Computer Programs with a Graphical User Interface

For example:

- The user enters the account number in the Account Number box
- The user clicks the Display Account Balance button
- The user clicks the Reset Window button to clear the text boxes and prepare the user interface for the next account number
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Input Operation

Step 1: User types the account number on the keyboard.

Step 2: The data is stored in RAM.

Step 3: Data is displayed on the computer screen.

Account Balance

Account Number: 73-0529

Account Balance

Display Account Balance

Reset Window
Output Operation

$13,432.85

Account Balance

Account Number: 73-0529
Account Balance: $13,432.85

Display Account Balance
Reset Window
Basic Arithmetic Operations

In many programs, arithmetic operations are performed on numeric data to produce useful output:

- Addition
- Subtraction
- Multiplication
- Division
1 Logical Operations

► Computers, through the use of computer programs, can compare numbers, letters, and special characters

► The program will perform a processing task, based on the result of the comparison

► Logical operations:
  • Comparing to determine if two values are equal
  • Comparing to determine if one value is greater than another value
  • Comparing to determine if one value is less than another value
Logical Operations: Equal Condition
Logical Operations: Equal Condition
Logical Operations: Less Than Condition
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Logical Operations: Greater Than Condition

![Payroll Information Window for Anna Junga]
- Employee Name: Anna Junga
- Hours Worked: 42
- Hourly Rate: 18.00
- Regular Pay: $720.00
- Overtime Pay: $54.00
- Total Pay: $774.00

![Payroll Information Window for George Ortega]
- Employee Name: George Ortega
- Hours Worked: 30
- Hourly Rate: 16.00
- Regular Pay: $480.00
- Overtime Pay: $0.00
- Total Pay: $480.00
1 Saving Software and Data

► When you develop and write a program, it must be saved on a disk
► When you want the program to run, you can cause the program to load into RAM and execute
► The program you write also can save data
  • Banking software must save account data
► In most cases, data is stored in a database
  • Collection of data organized in a manner that allows access, retrieval, and use of that data
Visual Basic 2005 and Visual Studio 2005

► Each program statement causes the computer to perform one or more operations
► The developer must follow the **programming rules**, or **syntax**, of the programming language precisely
► Most developers use a tool called **Visual Studio 2005** to write Visual Basic 2005 programs
► Visual Studio 2005 is an **integrated development environment (IDE)**
  • Provides services and tools that enable a developer to code, test, and implement a single program or series of programs
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1 Programming Languages

► Visual Basic 2005
  • Based on the Visual Basic programming language that Microsoft developed in the early 1990s
  • Based on the BASIC language

► C++
  • Derivative of the programming language, C

► Visual C#
  • Synthesis of C++ syntax and Visual Basic productivity benefits

► Visual J#
  • Java language for use with Visual Studio
.NET technologies and products were designed to work together to allow businesses to connect information, people, systems, and devices through software.

The .NET Framework provides tools and processes developers can use to produce and run programs.

- Most recent version is .NET Framework 2.0

1 .NET Framework 2.0
A **class** is a named group of program code
- A button is an example of a class

A **class library** stores the class and makes the class available to all developers who need to use it.
A button created from a class is called an **object**, or sometimes an **instance** of a class.

The process of creating a Button object from the Button class is called **instantiation**.

**Rapid application development (RAD)** refers to the process of using prebuilt classes to make application development faster, easier, and more reliable.
ADO.NET 2.0 (ActiveX Data Objects) provides the functionality for a program to perform four primary tasks when working with a database:

- Get the data
- Examine the data
- Edit the data
- Update the data
1 ASP.NET 2.0

► Allows developers to use Visual Studio 2005 to build Web application
► Almost all .NET framework objects are available in ASP.NET 2.0
► Easy to deploy a Web application on a Web server
Microsoft Intermediate Language (MSIL) and Common Language Runtime (CLR)

► Program compilation translates programming statements into instructions that can be understood by the electronics of the computer.

► Program compilation for a Visual Basic 2005 program creates a set of electronic code expressed in an intermediate language called the Microsoft Intermediate Language (MSIL).

► When the program is executed, a portion of .NET 2.0 called the Common Language Runtime (CLR) reads the MSIL and causes the actual instructions within the program to be executed.
Microsoft Intermediate Language (MSIL) and Common Language Runtime (CLR)
Types of Visual Basic 2005 Applications

► Windows application
  • Program will run on a computer or other device that supports the Windows GUI

► Mobile application
  • Designed to run on mobile devices running the Windows CE operating system

► Web site application
  • Uses ASP.NET 2.0 and runs on a Web server
Types of Visual Basic 2005 Applications

► Office application
  • Includes Writing Visual Basic 2005 code to automate and manipulate documents created using Microsoft Office

► Database application
  • Written using ADO.NET 2.0 to reference, access, display, and update data stored in a database

► Other types of applications include console applications, classes for class libraries, Web services, and device-specific applications
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CHAPTER 1 COMPLETE

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